

~~REAL-TIME CONTROL SYSTEM DEVELOPMENT TOOL~~

ABSTRACT OF THE DISCLOSURE

5 A development tool combines advantages of a simulation tool with an object-oriented modeling tool, including a real-time mathematical matrix library and an object model. The tool is applicable to any intelligent control system. A composite object group (COG) contains both sampled-data and event-driven capabilities. COGs merge procedural and object-oriented programming, and provide explicit, graphical integration of both types of processing and are fully hierarchical. A control system is built up of object-oriented
10 components, including these types: atomic, interface, data flow and state transition. A finite state machine (FSM) component is built from states, transitions, events and state transition components. Data flow components provide sampled-data capabilities. FSMs provide event-driven capabilities. Each component may include methods and attributes. A COG includes any type of component including COGs, graphical interconnections
15 between components, and is used to graphically build a model of a control system. Top-down object decomposition is combined with bottom-up component-based synthesis from reusable software to build a control system. Commonly used object interfaces may be defined as reusable objects. Mapping the computing resources of a computing device throughout the hierarchy of a control system is provided for modes, executable programs
20 and threads of a processor. Under mode mapping, the user graphically chooses in a simple and intuitive manner which components of the control system will run in which mode. Using executable mapping, the user chooses on which processor components will run. Within a given processor, each component of a control system may be assigned to individual execution threads within that processor simply by naming a thread.

25